168, are given up to the discussion of various ideas for making the reading of the essays more profitable; for this purpose, in three of these chapters, the general plan has been to make extracts from about fifty other of the competing essays, the extracts being connected by editorial comment. For example, in the chapter on "The special theory of relativity" there are extracts from competing essays of twenty-six authors, interlarded with more than twenty-five editorial comments. The following is the complete table of contents:

An Introduction to Mathematical Analysis. By F. L. GRIFFIN. Boston, Houghton, Mifflin Company, 1921. 12mo. 8 + 512 pp. Price $2.75.

Extracts from the Preface: "Under the traditional plan of studying trigonometry, college algebra, analytic geometry, and calculus separately, a student can form no conception of the character and possibilities of modern mathematics, nor of the relations of its several branches as parts of a unified whole, until he has taken several successive courses. Nor can he, early enough,

get the elementary working knowledge of mathematical analysis, *including integral calculus*, which is rapidly becoming indispensable for students of the natural and social sciences. Moreover, he must deal with complicated technique in each introductory course; and must study many topics apart from their uses in other subjects, thus missing their full significance and gaining little facility in drawing upon one subject for help in another.

"To avoid these disadvantages of the separate-subject plan the unified course presented here has been evolved. This enables even those students who can take only one semester's work to get some idea of differential and integral calculus, trigonometry, and logarithms. And specialist students, as experience has shown, acquire an excellent command of mathematical tools by first getting a bird's-eye view of the field, and then proceeding to perfect their technique.

"A regular course in calculus, following this, can proceed more rapidly than usual, include more advanced topics, and give a fine grasp: the principles and processes have become an old story. And the regular course in analytic geometry can be devoted to a genuine study of the geometrical properties of loci, since most of the type equations, basic formulas, and calculus methods are already familiar.

"The materials presented here have been thoroughly tried out with the freshman classes in Reed College during the past nine years. Problems and methods which have proved unsatisfactory have been eliminated. Care has been taken to make the concepts tangible, relate them to the familiar ideas of daily life, exhibit practical applications, and develop the attitude of investigation. . . .

"The course as given at Reed College takes four hours a week through the year, the number of lessons devoted to the several chapters, when taken complete, having run about as follows: 14, 4, 14, 8, 11, 12, 11, 16, 5, 7, 10, 6, 6, 5, 4. . . . The course is adapted to students of widely differing preparations. A knowledge of plane and solid geometry and of algebra through quadratics is the most suitable equipment; but a number of students who had had only two years of secondary mathematics have carried the course very well. On the other hand, students who have already taken trigonometry and college algebra find in the present course very little that merely duplicates their former work."

Contents—A preliminary word to students, 1–2; Chapter I: Functions and graphs (Some fundamental problems of variation: rates, mean values, extremes, zero values, formulas, etc.), 3–57; II: Some basic ideas analyzed (Instantaneous rates, tangents, areas, etc., as limits), 58–75; III: Differentiation (Derivatives of polynomials and u^n. Rates, extremes, etc.), 76–125; IV: Integration ($\int x^n dx$. Area, volume, momentum, work, fluid pressure, falling bodies, etc.), 126–155; V: Trigonometric functions (Solution of right and oblique triangles. Applications), 156–188; VI: Logarithms (Numerical calculations. Compound interest. Triangles), 189–235; VII: Logarithmic and exponential functions, 236–270; VIII: Rectangular coördinates (Mapping. Motion. *Analytic geometry:* line, circle, parabola, ellipse, hyperbola; translation, intersections), 271–325; IX: Solution of equations (Quadratics: $b^2 - 4ac$. Rational roots of higher equations. Horner's and Newton's methods), 326–342; X: Polar coördinates and trigonometric functions (Definitions. Radians. Periodic variations. Derivatives), 343–367; XI: Trigonometric analysis (Basic identities. Equations. More calculus. Involute. Cycloid. *S.H.M.* Damped oscillations. Addition formulas. Sums and products, etc.), 368–391; XII: Definite integrals (Summation of "elements": length, surface of revolution, etc. Plotting a surface. Double integration. Partial derivatives. Simpson's rule), 392–414; XIII: Progressions and series (*A.P.* and *G.P.* Investment theory. Maclaurin series. Calculation of functions. Binomia. theorem), 415–439; XIV: Permutations, combinations and probability ($P_{n,r}$; $C_{n,r}$. Chancel Normal probability curve. Least squares), 440–459; XV: Complex number system (Definition. Geometric representation. Operations. Roots of unity. Application), 460–472; Retrospect and prospect, 472–483; Appendix (Proofs for reference. Formulas. Integrals. Numerical tables: roots, natural and common logarithms, trigonometric functions for radians or degrees), 485–508; Index, 509–512.

Analytic Geometry with Introductory Chapter on the Calculus. By C. I. PALMER and W. C. KRATHWOHL. New York, McGraw-Hill Book Co., 1921. 12mo. 14 + 347 pages. Price $2.50.

Preface: "The object of this book is to present analytic geometry to the student in as natural and simple a manner as possible without losing mathematical rigor. The average student thinks visually instead of abstractly, and it is for the average student that this work has been written.